IN THE CLAIMS

1-3. (Canceled)

4. (Currently Amended) A method for generating timing constraints, comprising the steps of:

describing a digital circuit using a hardware description language (HDL); ~~standard HDL;~~

constructing said digital circuit from said HDL description; and

replacing flip-flops in said digital circuit with negative delay elements; ~~elements.~~

breaking any feedback paths in the digital circuit by inserting dummy flip-flops clocked by clocks all having a period of substantially zero.

5. (Currently Amended) The method of Claim 4, wherein said negative-time elements are implemented by buffers having a delay -T, where T is a delay equal to a flip-flop's clock period less a ~~typical~~ predetermined flip-flop delay.

6. (Canceled)

7. (Currently Amended) The method of ~~Claim 6,~~ Claim 4, where said step of breaking said feedback paths is conducted so as to avoid breaking feedforward paths.
~~wherein cycles are only broken on backward paths.~~

8. (Currently Amended) The method of Claim 4, where said replacing step is conducted so that ~~wherein clocks and registers constructed have the property of slack equivalence, wherein~~ predetermined optimization goals at each gate are substantially the same as they would be if registers were already optimally distributed.

9. (Currently Amended) The method of Claim 5, wherein ~~the actual value of~~ T is set to a clock period of a flip-flop being replaced.

10. (Currently Amended) A method for generating timing constraints, comprising the steps of:

describing a digital circuit using a hardware description language (HDL);

constructing said digital circuit from said HDL description;

replacing flip-flops in said digital circuit with negative delay elements;

~~The method of Claim 4, further comprising the step of:~~

where some of the negative delay elements comprise buffers, said buffers having a load capacitance ~~using a buffer to replace a flip-flop, said buffer having a typical load capacitance,~~ representing an average or weighted-average load capacitance taken over inputs of all gates and flip-flop D pins in a target technology library.

11. (Currently Amended) A method for generating timing constraints, comprising operations of:

describing a digital circuit using a hardware description language (HDL);

constructing said digital circuit from said HDL description;

replacing flip-flops in said digital circuit with negative delay elements;

wherein said negative-time elements are implemented by buffers having a delay -T, where T is a delay equal to a flip-flop's clock period less a predetermined flip-flop delay;

~~The method of Claim 5, further comprising the step of:~~

describing a value of T using a capacitance/delay curve representing a composite of gates in a target technology library, Q pins of flip-flops in said target technology library, and a series of increasingly powerful buffer trees;

wherein said curve is first computed, then it is offset by setting a delay corresponding to a predetermined ~~typical~~ load capacitance to –T;

where ~~whereby~~ a larger capacitive load results in a longer delay; and

where ~~whereby~~ if a near-zero load is imposed a delay is –(T + t), where t is a (positive) difference in delay between a predetermined ~~typical~~ load and a lesser load.

12. (Currently Amended) The method of Claim 4, further comprising the steps of:

after logic optimization, reinstalling registers in place of said negative-delay elements;

removing all dummy ~~zero-clocked cycle-breaking~~ flip-flops;

applying a retiming process ~~algorithm~~ to reposition registers to optimize clock frequency and register count, said operation of applying the retiming process producing a retimed design; and

after retiming, applying further logic optimization to the retimed design.

~~after retiming, performing a second logic optimization pass to fine-tune said retimed design.~~

13-18. (Canceled)